UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
FIVE POST OFFICE SQUARE SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

February 25, 2010

Tim Cosgrave
Harvard Project Services LLC
249 Ayer Road, Suite 206
Harvard, MA 01451-1132

Re: EPA review of UniFirst's draft VI Scope of Work, dated October 9, 2009

Dear Mr. Cosgrave:

EPA, in consultation with MassDEP, has reviewed your response to comments (Response) and revised "Indoor Air Quality and Vapor Intrusion Assessment Scope of Work" (Revised SOW), which was received on February 18, 2010, for the UniFirst Source Area Property (15 Olympia Avenue, Woburn, MA). EPA appreciates your willingness to relocate sampling locations within the building and supports the proposed March 7, 2010 sampling schedule; however, we do not agree that there should be any changes to the screening levels or analytical detection limits because a potential future residential exposure scenario is applicable. This screening approach is consistent with the EPA draft Vapor Intrusion Guidance (2002) and Region 1's risk-based screening approach (Risk Update No. 3, August 1995). If screening levels are exceeded a risk evaluation for both current and future uses will be necessary. Some other concerns with the Response relate to removing historically detected compounds above EPA's residential screening criteria from the analyte list; collecting the indoor air samples over an 8 hour period (e.g., flow rate of 0.01 L/min); and including petroleum hydrocarbon fractions in the APH analyses.

Please find attached our response to your Response as well as additional comments on the QAPP. I feel the schedule can still be maintained with minor adjustments to the laboratory methods to ensure sufficiently low detections (e.g. selective ion monitoring [SIM]) for comparing to the Agency's residential screening criteria. The issue of analytical methods having sufficiently low detection limits does not interfere with any schedule for ordering canisters needed for the sub-slab and indoor air sampling within the existing building.

We look forward to you quickly implementing these responses, finalizing the SOW and QAPP, and implementing the initial round of soil gas and indoor air sampling as soon as possible. If you would like to discuss theses responses further, please contact me at 617.918.1323.

Please contact me immediately with your building inspection schedule and sub-slab and indoor air sampling dates, if they differ from your SOW March 1st and March 7th dates.

Sincerely,

Joseph F. LeMay, P.E.
Office of Site Remediation and Restoration

cc: Bob Cianciarulo, EPA
Cindy Lewis, EPA
Margaret McDonough, EPA
Peter Kahn, EPA
Steve DiMattei, EPA
Scott Huling, EPA ORD
Joe Coyne, MassDEP
David Sullivan, TRC Solutions
Clayton Smith, demaximis

EPA Response to UniFirst Comment #6 Response: Since the collection of shallow groundwater VOC data is the first screening step of the vapor intrusion (VI) pathway, at a minimum, any compound that historically was detected at a concentration that exceeds the VI groundwater screening criteria is recommended for inclusion in the groundwater sampling program. This would include: 1,1,2-trichloroethane, 1,2,4-trimethylbenzene, 1,2-dichloropropane, 1,4-dichlorobenzene, bromodichloromethane and chlorobenzene. In addition, 1,3-dichlorobezene, which has no screening criteria, should be retained since the screening criteria for 1,4-dichlorobenzene is a reasonable surrogate, and there is a 1,3-dichlorobenzene detection that exceeds the 1,4-dichlorobenzene screening value. The above listed compounds should be included in the groundwater sampling program. Any compound that exceeds a screening criteria, even if the exceedance only occurs once, has the potential to contribute to cumulative risks and hazards above risk management criteria, considering that the single exceedance could occur in a critical location (e.g., immediately upgradient of a residential home). Please update the Scope of Work and QAPP accordingly.

EPA Response to UniFirst Comment #7 and #33 Responses: In 1995, EPA Region 1 adopted a risk-based screening approach that has been used consistently within the Region I Superfund Program. EPA Region 1 Risk Update No. 3 (August 1995) details the conservative risk-based screening process used to select contaminants of potential concern (COPCs) at Superfund Sites. The screening involves the comparison of maximum detected medium-specific concentrations to medium-specific risk-based concentrations associated with target risk levels and conservative default exposure assumptions. As part of the screening process described in the 1995 Risk Update, EPA Region 1 adopted Region III Risk-Based Concentrations (RBCs) (generically set at an incremental lifetime cancer risk [ILCR] of 1E-06 for carcinogens and hazard quotient [HQ] of 1 for noncarcinogens) with the following modifications:

- a hazard quotient of 0.1 rather than 1 is used for screening of noncarcinogens; and
- residential risk-based concentrations are used for the screening.

The Region III RBCs have been replaced by the Regional Screening Levels (RSLs), but the stipulated modifications continue to apply to the screening process. The point of departure as specified in the National Contingency Plan (ILCR = 1E-06) is used as the risk screening basis for carcinogens such that appropriate risk management decision can be made following the risk assessment, which compares cumulative receptor risk estimates to the EPA target risk range of 1E-04 to 1E-06 to determine whether the risks are below, within or above the target risk range.

With regards to the HQ designation of 0.1, EPA Region 1 does state that if the list of noncarcinogenic COPCs is too lengthy to carry through the risk calculation process, further modifications to the screening may be conducted in consultation with an EPA risk assessor (e.g., target organ analysis). However, this type of analysis and modification of the screening levels should occur during the risk assessment, *not during the data collection stage*, and, based on the list of compounds slated for analysis, the number of compounds potentially being carried through as COPCs would not be too onerous to evaluate in a risk assessment. Setting screening levels at this stage of the process (i.e., prior to analytical data collection) is done to develop Project Action Limits (PALs), which assure that the data collected are of sufficient quality to meet the needs of the risk assessment, including the COPC screening process.

As for the use of residential RSLs, the Superfund process requires that current and future land use be evaluated in the risk assessment process. A risk-based determination must be provided in order for institutional controls or other restrictions on property use to be implemented at a site. Therefore, future residential use must be considered to provide the necessary risk-based determination as to any future land use controls that will be required. Considering the needs of any future risk assessment to be performed using these data, EPA's December 18, 2009 comment letter presented screening levels based upon residential-based values using an ILCR = 1E-06 and a HQ = 0.1.

The target groundwater concentrations were determined using the following formula, consistent with the procedure use to set target groundwater concentrations in EPA's *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) (EPA, 2002)*:

Target Groundwater Concentration (ug/L) = (Target Indoor Air Concentration x 10^{-3} m^3/L) / (H x α)
Where:

Target Indoor Air Concentration = ug/m^3 set at ICLR = 10^{-6} or HQ = 0.1 (set at a ILCR = 10^{-6} or HQ = 1 in the 2002 draft guidance)
α = soil gas to indoor air attenuation factor (0.001 and partitioning across the water table obeys Henry's Law)
H = unitless Henry's Law Constant

The values presented by EPA Region 1 in the December 18, 2009 comment letter are different than those provided in the 2002 draft guidance due to: (1) adjustment of screening values for noncarcinogens to a HQ = 0.1 rather than a HQ = 1 as used in the 2002 draft guidance; (2) adjustment of 2002 draft guidance values that were truncated at the Maximum Contaminant Limit (MCL) to a risk-based value; and (3) the adjustment of screening values provided in the 2002 draft guidance to reflect updated inhalation toxicity values adopted by EPA Region 1 subsequent to 2002. Please find attached a revised screening level table which further updates the December 18, 2009 table through the application of additional toxicity values available through the RSL table. The attached table also provides the specific calculations for each of the screening values. This screening table shall be used as the groundwater Vapor Intrusion Residential Screening Criteria at the Wells G&H Site (e.g., UniFirst, WR Grace). Please update the Scope of Work and QAPP accordingly.

The purpose of providing screening levels at this point is primarily to assist in developing PALs, such that the data gathered will be of sufficient quality for the future intended use of the data. Possible future uses of the groundwater and indoor air data may be to indicate the need for future investigation (e.g., soil gas sampling if groundwater screening levels are exceeded in the residential neighborhood) or to perform a future risk assessment (e.g., assess indoor air risk within the UniFirst building). Should a risk assessment be necessary for indoor air at the UniFirst building, the screening criteria specified should be used to select COPCs. However, appropriate exposure assumptions should then be used to assess current commercial exposures as well as future potential residential exposures to indoor air.

EPA Response to Unifirst Response Comment #9: Sampling for APH compounds only, while excluding the APH petroleum hydrocarbon fractions, is ignoring a potentially large mass of volatile petroleum hydrocarbons that may be present at the site. Target compounds (e.g., BTEX) typically make up a small percentage of the total mass of petroleum compounds that may have been released at the site. Therefore, APH fractions (C5-C8 aliphatics, C9-C12 aliphatics, and C9-C10 aromatics) must be included in the analytical program along with the APH target compounds. Please update the Scope of Work and QAPP accordingly.

EPA Response to UniFirst Comment #10 Response: Please inform EPA of any wells identified as "non-sampleable", as soon as possible, so EPA can evaluate the need for any additional well installations.

EPA Response to UniFirst Comment #11 Response: Please find attached copies of EPA Region 1 revised low flow groundwater sampling SOPs dated January 19, 2010.

EPA Response to UniFirst Comment # 16 Response and Revised SOW pages 11 and 14: The indoor air samples should be collected over an 8-hour period to reflect building occupancy. To obtain a sub-atmospheric sample over an 8-hour period using a 6-liter canister, the flow rate should be approximately 10 ml/min; this will result in an ending vacuum in the canister of approximately 6 inches of mercury. The language in the SOW page 11, 2nd paragraph, 4th sentence should be changed to reflect the information stated above. Note: EPA's prior December 18, 2009 comment regarding 0.1 L/min – 0.2 L/min flow rates was applicable to sub-slab sampling, not indoor air sampling.

For sub-slab soil gas canister sampling, if a flow rate of 0.1 l/min (100 ml/min) is used and the canister is allowed to reach atmospheric pressure (0 gauge pressure), the sampling period would be 1-hour. If a flow rate of 0.2 l/min (200 ml/min) is used and the canister is allowed to reach atmospheric pressure (0 gauge pressure), the sampling period would be 30 minutes. The language in the SOW page 14, 1st paragraph should be changed to reflect the information stated above.

In the SOW on page 11, 3rd paragraph, the last sentence indicates an indoor air duplicate/replicate canister sample will be collected by placing two 6-liter canisters side-by-side with their ports connected using a T-connection. It is recommended that the T-connection not be used and the canisters simply be placed side-by-side to collect a duplicate sample.

EPA Response to UniFirst Comment #36 Response: September 2010 is currently preferred.

Scope of Work: Page 17, Section 8.0, References: Correct the ASTM method reference to reflect the current version of the method. Revise SOW accordingly based upon above responses.

Specific Comments on the Quality Assurance Project Plan, Revision 0, February 2010

1. Page 14, Form F: Include the APH method on this table.
2. Page 15, Form G, Include the APH method on the table of analytical methods and the table of laboratory SOPs.
3. Page 20, Form I: Include the calibration criteria and corrective action for the APH method.
4. Page 24, Form K, Analytical Sensitivity and Project Criteria:
    a. All reporting limits in this table are from the low-level TO-15 method provided in Appendix 1. Please clarify which compounds will be analyzed using SIM, as noted in the footer of this table.
    b. The precision criteria is listed as 30% for all compounds. However, as per the field duplicate criteria on Form L. the laboratory duplicate criteria on Form K, and the laboratory information in Appendix 1, the precision criteria on this form should be 25% for all compounds.
    c. Update this table to include all compounds requested in the Response to Comment #6 above as well as the APH hydrocarbon ranges.
    d. Update this table to include the screening levels presented in the Response to Comments #7 and 33.
    e. Please indicate to which compound footnote "B" on this table applies.
5. Page 28, Form M, Laboratory Quality Control:
    a. Please provide the frequency and corrective action requirements for media certification blanks.
    b. Laboratory duplicates are noted as aliquots of the same sample being prepared and analyzed at the same time. This should be corrected to state two aliquots of the same sample being prepared and analyzed in the same manner (not at the same time).
    c. Update this table to include any criteria specific to the APH method.

6. Appendix 1, Analytical Method SOPs:
    a. The documents provided for full scan TO-15 and SIM TO-15 are not SOPs. These documents just summarize the quality control of each method and are not standard operating procedures. Please submit the SOPs.
    b. The document provided for TO-15 SIM did not include reporting limits and typical target compounds analyzed using this method.
    c. Please include the laboratory's SOP for APH analysis.

ATTACHMENT 1

Vapor Intrusion Screening Level for Indoor Air and Groundwater[1]

						Target Indoor Air Concentration (ILCR=1E-06 or HQ=0.1)		Target Groundwater Concentration
Chemical	Basis of Target Concentration C=Cancer Risk; N/C=Non cancer Risk	InhalationUnit Risk ($\mu g/m^3)^{-1}$		Reference Concentration ($\mu g/m^3$)		$\mu g/m^3$	Dimensionless Henry's Law Constant (unitless)	$\mu g/L$
Chloroform	C	2.30E-05	I	9.80E+01	A	1.06E-01	1.50E-01	7.05E-01
1,1-Dichloroethane	C	1.60E-06	C	NA		1.52E+00	2.30E-01	6.61E+00
1,2-Dichloroethane	C	2.60E-05	I	2.40E+03	A	9.36E-02	4.00E-02	2.34E+00
1,1-Dichloroethene	NC	NA		2.00E+02	I	2.00E+01	1.07E+00	1.87E+01
Tetrachloroethene	C	5.90E-06	C	2.70E+02	A	4.12E-01	7.50E-01	5.50E-01
Trichloroethene	C	2.00E-06	C	1.00E+01	N	1.22E+00	4.21E-01	2.89E+00
Vinyl chloride	C	4.40E-06	I	1.00E+02	I	1.60E-01	1.10E+00	1.45E-01
trans-1,2-Dichloroethene	NC	NA		6.00E+01	P	6.00E+00	3.80E-01	1.58E+01
cis-1,2-Dichloroethene	NC							No value available (0.5)
1,1,1-Trichloroethane	NC	NA		5.00E+03	I	5.00E+02	7.00E-01	7.14E+02
Methylene chloride	C	4.70E-07	I	1.00E+03	A	5.18E+00	9.00E-02	5.75E+01
Carbon tetrachloride	C	1.50E-05	I	1.90E+02	A	1.62E-01	1.20E+00	1.35E-01
Xylenes	NC	NA		1.00E+02	I	1.00E+01	2.80E-01	3.57E+01
Toluene	NC	NA		5.00E+03	I	5.00E+02	2.70E-01	1.85E+03
Chlorobenzene	NC	NA		5.00E+01	P	5.00E+00	1.50E-01	3.33E+01
1,2-Dichloropropane	C	1.00E-05	C	4.00E+00	I	2.43E-01	1.15E-01	2.12E+00
1,1,2-Trichloroethane	C	1.60E-05	I	NA		1.52E-01	3.70E-02	4.11E+00
1,2,4-Trimethylbenzene	NC	NA		7.00E+00	P	7.00E-01	2.50E-01	2.80E+00
1,2-Dibromoethane	C	6.00E-04	I	9.00E+00	I	4.06E-03	3.00E-02	1.35E-01
1,2-Dichloropropene								No value available (0.5)
Benzene	C	7.80E-06	I	3.00E+01	I	3.12E-01	2.30E-01	1.36E+00
Bromoform	C	1.10E-06	I	NA	I	2.21E+00	2.19E-02	1.01E+02
Ethylbenzene	C	2.50E-06	C	1.00E+03	I	9.73E-01	3.20E-01	3.04E+00
Isopropylbenzene	NC	NA		4.00E+02	I	4.00E+01	4.74E+01	8.44E-01
trans-1,3-Dichloropropene	C	4.00E-06	I	2.00E+01	I	6.08E-01	7.24E-01	8.40E-01
Naphthalene	C	3.40E-05	C	3.00E+00	I	7.16E-02	1.80E-02	3.98E+00
1,3-Dichlorobenzene								No value available (0.5)
1,4-Dichlorobenzene	C	1.10E-05	C	8.00E+02	I	2.21E-01	9.85E-02	2.25E+00
Bromodichloromethane	C	3.70E-05	C	NA		6.58E-02	7.00E-02	9.40E-01

[1] Table Footnotes:

All Target Indoor Air and Groundwater Concentrations are risk-based; none are truncated at the MCL.

Toxicity Values used as basis of Target Indoor Air and Groundwater Concentrations are available on the Regional Screening Levels Table at http://www.epa.gov/reg3hwmd/risk/human/index.htm

Toxicity Value References: C = CalEPA; I = IRIS; ATSDR = Agency for Toxic Substances and Disease Registry; P = PPRTV; New York Dept. of Health (Value not basis of screening level)

Henry's Law Constants from Johnson and Ettinger Model

Footnotes:

1 - Screening value is based on 1x10-6 cancer risk or HI = 0.1. Value in Draft Vapor Intrusion Guidance (2002) is based on MCL.

2 - Screening value is based on updated toxicity value found in Regional Screening Levels table (http://www.epa.gov/reg3hwmd/risk/human/index.htm)

3 - Inhalation toxicity value not available. Groundwater screening level set at detection limit.